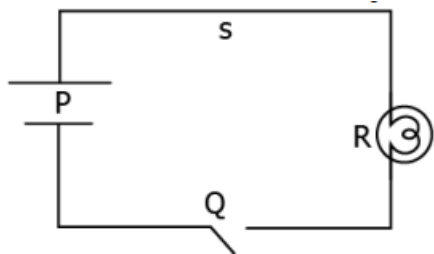




CLASS: VII	DEPARTMENT: SCIENCE 2023-2024	DATE: 05.06.2023
WORKSHEET NO: 3 WITH ANSWERS	TOPIC: ELECTRIC CURRENT AND ITS EFFECTS	Note: A4 FILE FORMAT
NAME OF THE STUDENT:	CLASS & SEC:	ROLL NO.

D) OBJECTIVE-TYPE QUESTIONS

- Continuous flow of electric current through a circuit requires:
 - a source of electric current
 - a conducting material
 - a closed circuit
 - d) All of these**
- Which of the following appliance does not use the heating effect of electric current?
 - electric iron
 - b) electric bell**
 - electric bulb
 - electric geyser
- An electrician wants to prevent damage to electrical appliances in a house due to a sudden rise in the amount of electric current. Which of these appliances should be installed to avoid the damages?
 - Light-emitting diode
 - b) Miniature circuit breakers**
 - Incandescent electric bulbs
 - Compact fluorescent lamps
- The strength of an electromagnet can be increased by:
 - decreasing the number of coils
 - b) increasing the number of coils**
 - decreasing the strength of the current
 - All of these
- The image represents an electric circuit with different components. Which of the marked components represent a battery/cell in the circuit?



a) P

b) Q

c) R

d) S

6. An electromagnet works on the principle of:
- chemical effect of electric current
 - heating effect of electric current
 - magnetic effect of electric current**
 - electro-chemical effect
7. A student wants to conduct an experiment using an electric circuit. He wants to reduce the risk involved in the procedure. Which of these methods should he adopt to reduce the risk involved in an electric circuit?
- Use electricity from mains
 - Use an inverter for electricity
 - Use a generator for electricity
 - Use electric cells for electricity**
8. The element in an electric iron is made of:
- Iron
 - Nickel
 - Nichrome**
 - Tungsten
9. A student understands that a hammer in an electric bell strikes the gong when the current passing through the circuit turns the coil into an electromagnet. He also observes that when a switch is held on, the hammer repeatedly strikes the gong. What causes the hammer to continue striking?
- Production of heat in the wires of the circuit
 - Melting of the wire due to the flow of electricity
 - Repetition of breaking and completion of the circuit**
 - Material of the gong causes vibration in the hammer
10. An electric bell works when:
- electrical energy is converted into light energy
 - electrical energy is converted into sound energy**
 - electrical energy is converted into heat energy
 - sound energy is converted into electrical energy

For question numbers 11-14, two statements are given- one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (i), (ii), (iii) and (iv) as given below -

- i) Both A and R are true and R is the correct explanation of the assertion.
- ii) Both A and R are true but R is not the correct explanation of the assertion.
- iii) A is true but R is false.
- iv) A is false but R is true.

11. **Assertion (A):** A battery is a combination of two cells only.

Reason (R): The positive and negative terminals are generally marked on the cells.

Ans: iv) A is false but R is true.

12. **Assertion (A):** The heating up of a thin conducting wire on passing an electric current through it, is known as the heating effect of current.

Reason (R): Various electrical appliances that are based on the heating effect of current contain a coil of wire called an element.

Ans: (ii) Both A and R are true but R is not the correct explanation of the assertion.

13. **Assertion (A):** Fuse is a safety device which prevents damage to electrical circuits and possible fires.

Reason (R): The fuse wire blows off and breaks the circuit and prevents the fire and damage.

Ans: (i) Both A and R are true, and R is the correct explanation of the assertion.

14. **Assertion (A):** A current-carrying wire deflects the needle of a magnetic compass kept near it.

Reason (R): Even when the electric current is switched off, the coil acts like a magnet.

Ans: iii) A is true but R is false.

II) VERY SHORT ANSWER TYPE QUESTIONS (2 M):

1. Draw the circuit symbols for:

- a) A cell b) A battery of two cells c) An open switch d) A bulb

[Hint: a) A cell 

b) A battery of two cells 

c) An open switch 

d) A bulb 

2. Differentiate cells in series and cells in parallel.
[Hint: The positive terminal of one cell is connected to the negative terminal of the other cell in a row, one after another is called cells in series connection. The cells which are arranged parallel to one another are called cells in parallel connection.]
3. What is an electric fuse? On what principle does it work?
[Hint: An electric fuse is a safety device used in electric circuits which protects the electrical appliances and prevents possible fires. It works on the principle of the heating effect of electric current.]
4. What happens when a compass needle is brought near a current-carrying wire?
[Hint: A compass needle is a tiny magnet which points in a North-South direction. When it is brought close to a current-carrying wire, which is an electromagnet, the needle gets deflected. This happens due to the magnetic effect of electric current.]
5. Boojho made an electromagnet by winding 50 turns of wire over an iron screw. Paheli also made an electromagnet by winding 100 turns over a similar iron screw. Which electromagnet will attract more pins? Give reason.
[Hint: The magnetic effect directly depends on the number of turns of wire on an electromagnet. The electromagnet of Paheli is stronger as it has a greater number of turns of wire on it and will attract more pins.]
6. What do you mean by the magnetic effect of electric current?
[Hint: When an electric current is passed through a conductor, a magnetic field is set up around it which exists as long as the current flows in the conductor. This is called the magnetic effect of electric current.]

III) SHORT ANSWER TYPE QUESTIONS (3 M):

1. Batteries used in tractors, trucks and inverters are also made from cells. Then why is it called a battery?
[Hint: These are called batteries because they are a collection of cells. The cells are not dry cells. There are several sets of plates and each set of plates acts like a cell. In trucks, tractors and inverters, cells are internally arranged and we need not connect them externally, so we called it as a battery.]
2. Mention the precautions to be taken while using electricity in our homes.
[Hint: Never touch a lighted electric bulb connected to the mains. It may be very hot and your hand may get burnt badly. Do not experiment with the electric supply from the mains or a generator or an inverter. You may get an electric shock which may be dangerous. Use only electric cells for all experiments.]

3. Write the differences between an open circuit and a closed circuit.

Open circuit	Closed circuit
i) A circuit that is not complete and does not allow current to pass through it is called an open circuit.	i) A circuit that is complete and allows electric current to pass through it is called a closed circuit.]
ii) The switch is in the OFF position and the circuit is incomplete and hence the bulb doesn't glow.	ii) The switch is ON and the circuit is complete, so the bulb glows.
iii) No current flows through any part of the circuit.	iii) The current flows throughout the circuit instantly.

4. Why does the fuse wire have a low melting point?

[Hint: A fuse wire has a low melting point. Whenever the current flowing through an electric circuit exceeds the safety limit, the fuse wire heats up and melts down, resulting in a break in the path of the current flow. This stops the flow of current in the circuit.]

5. Explain a few reasons for excessive currents in our houses.

[Hint: i) Direct touching of wires- This may happen if the insulation on the wires has come off due to wear and tear. This may cause a short circuit.

ii) Connecting many devices to a single socket - This may cause an overload in the circuit. Short circuits and overloads may result in electrical fires]

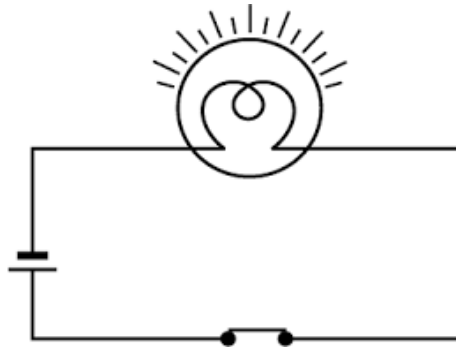
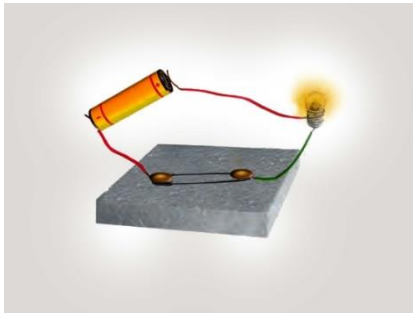
6. Explain how to make a simple electromagnet

[Hint: Take a long piece of insulated, flexible wire and an iron nail. Wind the wire tightly around the nail in the form of a coil. Connect the free ends of the wire to the terminals of a cell through a switch. When the current is switched on, the iron nail acts like an electromagnet.]

7. How does the electric heater or an electric iron work?

[Hint: An electric heater and an electric iron work based on the heating effect of electricity. These appliances contain a coil of wire called an element. When these appliances are switched on after connecting to the electric supply, the elements become red hot and give out heat.]

8. What are circuit diagrams? Draw a circuit diagram to represent the circuit shown in the given figure.



[Hint: A simple pictorial representation of an electrical circuit, using standard symbols for electrical components, is called a circuit diagram.]

IV) LONG ANSWER TYPE QUESTIONS (5 M):

1. List five uses of electromagnets

[Hint: (i) Electromagnets are used in loudspeakers to amplify the signals so that we can hear the sound.

(ii) They are used in electric bells.

(iii) Electromagnets are used in cranes to lift heavy loads of iron and steel.

(iv) They are used in telephones, refrigerators, generators, etc.

(v) Electromagnets are also used to separate magnetic material from the junk.]

2. Explain the term electric circuit and its components.

[Hint: An electric circuit is an uninterrupted path through which electric current flows.

The components of an electric circuit are:

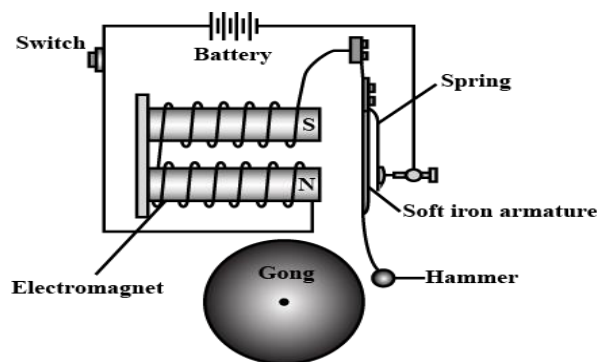
i) A cell or a battery which is a source of electrical energy.

ii) Conducting wires which allow current to flow through it.

iii) A bulb which glows when current passes through it.

iv) A switch to break or complete the flow of current

3. With the help of a neat labelled diagram explain the working of an electric bell.



[Hint: An electric bell works with the help of an electromagnet. It is made up of a coil of wire wound around an iron piece, resembling an electromagnet. When current passes through it, a magnetic field is produced. When the circuit is complete, the soft iron armature is attracted towards the electromagnet. As the hammer moves towards the gong and produces the sound, the circuit breaks. This stops the electromagnet from attracting the armature anymore. The armature comes back to its original position due to the spring effect. While doing so, it touches the metal connector and the circuit is complete again. In this way, we get repeated hammering, resulting in the ringing of an electric bell.]

V-SOURCE-BASED/ CASE STUDY-BASED QUESTIONS

1. Read the passage and answer the following questions:

Incandescent electric bulbs are often used for lighting but they also give heat. It means that a part of the electricity consumed is used in producing heat. This is not desirable as it results in the wastage of electricity. Fluorescent tube lights and compact fluorescent lamps (CFLs) are better electricity-efficient lighting sources. Nowadays, the use of light-emitting diode (LED) bulbs is increasing. For producing a given intensity of light, LED bulbs consume less electricity as compared to incandescent bulbs or fluorescent tubes or CFLs. Thus, LED bulbs are much more electricity efficient and therefore preferred.

i) Why does a glowing electric bulb become warm?

[Hint: A part of electricity consumed is used in producing heat.]

ii) What is meant by the heating effect of electric current?

[Hint: When an electric current passes through a wire, the wire gets heated up. This is called the heating effect of electric current.]

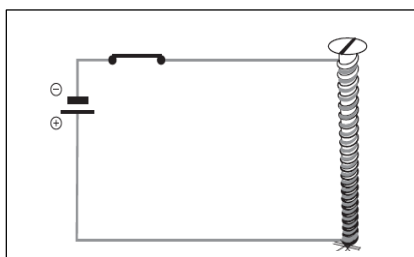
iii) Damaged fluorescent tubes and CFLs need to be disposed off safely. Why?

[Hint: Fluorescent tubes and CFLs contain mercury vapour, which is toxic in nature.]

iv) Why should we prefer using CFL and LED bulbs over normal bulbs?

[Hint: Compact fluorescent lamps (CFLs) reduce the wastage of electricity and can be fixed in ordinary bulb holders. Nowadays, Light Emitting Diode (LED) bulbs are preferred because it consumes less electricity as compared to incandescent bulbs or fluorescent tubes or CFLs.]

2. Rohan has wound a long-insulated piece of wire around an iron nail in the form of a coil. The free ends of the wire are connected to a cell through a switch. The current is switched on and some pins are placed near the ends of the nail.



(i) Why does the nail attract the pins?

[Hint: Because iron nail turns to an electromagnet when current flow through it.]

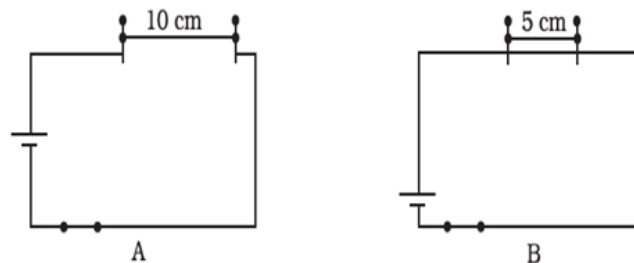
(ii) What will happen if we connect more cells in the circuit?

[Hint: It will attract more pins as the strength of the electromagnet increases.]

(iii) What will happen if we use some other material like a plastic straw in place of the nail?

[Hint: Plastic straw is an insulator so it will not turn into an electromagnet.]

3. Paheli took a wire of length 10 cm. Boojho took a wire of 5 cm of the same material and thickness. Both of them connected the wires as shown in the circuit given in the figure given below. The current flowing in both circuits is the same.



(i) Will the heat produced in both cases be equal? Explain.

[Hint: No, the amount of heat produced in both the wires will be different because the amount of heat produced in a wire on passing electric current depends upon the length of the wire and here length is different for both the wires.]

(ii) Will, the heat produced be the same if the wires taken by them are of equal lengths but of different thicknesses? Explain.

[Hint: No, because the amount of heat produced in a wire depends upon the thickness of the wire.]

iii) What are the factors on which the heat produced in a wire depends?

[Hint: The heat produced in a wire depends upon the type of material, length and thickness of the wire.]

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